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MONTANA DEPARTMENT OF FISH AND GAME

ANNUAL REPORT

NONGAME SURVEYS AND INVENTORY

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INTRODUCTION

The objectives of Montana's nongame and endangered species program are to:
1) maintain optimum population levels of nongame wildlife for human enjoyment, for scientific purposes, and to ensure their perpetuation as members of ecosystems; and
2) protect, maintain, and if possible enhance numbers of those species of wildlife indigenous to this state that may be found to be endangered within the state.

Four basic procedures are used to meet the requirements of these objectives:
1) Determine those species of nongame wildlife which are in need of management, define needs, and implement appropriate actions;
2) Promote public understanding and appreciation of nongame and endangered species and their ecological role;
3) Participate in recovery planning and plan implementation for endangered species; and
4) Acquire, protect, or enhance key habitats essential to the welfare of certain nongame and endangered species.

A detailed discussion pertinent to implementation of these procedures has been presented elsewhere (Anon. 1975 and Flath 1977c). A brief description of the basic program was provided by Flath (1975a).

Though wildlife managers have typically recognized the value of all forms of wildlife, the concept of management activities aimed specifically at nongame species received little attention prior to 1973. Most benefits to nongame species came about as side effects of management actions intended to benefit popular game species. For example, a water management plan might be implemented on a marsh area for the purpose of increasing duck production with a resultant increase in use of the area by shorebirds, passerines, and other nongame wildlife.

In 1972, a model state law for conservation of nongame and endangered species was prepared by the International Association of Game, Fish and Conservation Commissioners and The Wildlife Society. Copies were printed and distributed to all 50 states in August of that year by the Winchester-Western Division, Olin, Inc. (Anon. 1972). The 1973 Montana Legislature passed the model act with some modifications, including deletion of a funding provision. The Montana Department of Fish and Game was named as the state agency responsible for this program.

Montana's nongame and endangered species program was staffed with one biologist in June, 1974. A summer field technician was added to the program in 1977. In addition, many persons have contributed to the accumulation of biological data through volunteer services. Most notable are personnel of the Montana Department of Fish and Game and members of the National Audubon Society.

NONGAME ACTIVITIES

Montana law defines nongame wildlife as "any wild mammal, bird, amphibian, reptile, fish, mollusk or crustacean or other wild animal not otherwise legally classified by statute or regulation of this state" (Sec. 26-1802 (6) R.C.M. 1947). Since endangered species are classified as such, by federal and state statute, they are not considered "nongame" for the purposes of this section.

Approximately 75 percent of the total program effort has been aimed at nongame species. Activities have included information and education efforts (Flath 1977b and 1978b), research, management and survey and inventory.

Prior to determining management procedures for any one form of nongame wildlife, one must recognize that these actions affect other nongame species in various ways. For this reason it is desirable to select those species which are most in need of consideration, and at the same time relegate the needs of widespread, abundant and secure species to a lower priority.

A priority rating system (Anon. 1975) was developed to aid identification of those species which should be given "first" attention. These forms of nongame wildlife have been designated as being of "special interest or concern." If the needs of these species are met and their welfare is safeguarded, the integrity of the nongame wildlife community should be generally secure.

County and Latilong inventories of these selected species have been published separately (Skaar 1975, Flath 1977a, 1978a). Since new knowledge is acquired so rapidly, it is necessary to revise the inventories each year. As an example, the 1978 version incorporates 151 changes from the 1977 version. New information is compiled on a continual basis and incorporated into the inventories each January.

Mammalian Studies

Prairie Dog Investigations

Status of the white-tailed prairie dog *(Cynomys leucurus)* in Montana

The white-tailed prairie dog is a peripheral species in Montana, reaching the northern limits of its range in southern Carbon County. The only published references to the species' occurrence in Montana were by Hollister (1916) and Hoffman and Pattie (1968). Prior to present investigations the status of the species in Montana was completely unknown.

The objectives of this study were to (1) identify the range of the species in Montana, (2) estimate current population levels, and (3) identify potential threats to the continued existence of the species.

Procedures included interviews with resource management personnel and local residents to obtain locations of prairie dog colonies. All located colonies were visited, the prairie dogs were identified, and, for white-tail colonies, the colony was mapped, acreage estimated and general habitat observations were noted.

Fifteen colonies were located which together comprise about 700 A. Status and location of these colonies are presented in a final report to be published elsewhere (Flath, in prep.).

Mound characteristics of white-tailed prairie dog maternity burrows

Mound characteristics of white-tailed prairie dogs range in size from virtually nothing to as much as 6 m in diameter. Preliminary observations of white-tailed prairie dog litters suggested associations between litters and burrows with particularly large mounds. If specific maternity burrows could be readily identified, the reproductive status of a particular colony could be rapidly assessed by noting frequency of occurrence of current maternity burrows.

Accordingly, the objectives of this project were to (1) determine whether white-tailed prairie dogs use specific burrows for maternity purposes; (2) establish criteria for identification of maternity burrows; and, (3) establish a pattern in mound size variation.

Field studies involved 2,055 measurements of 685 mounds. These were categorized and subjected to an analysis of variance which showed that litters of pups occurred in burrows with mounds significantly larger than those of non-maternity burrows. Much of the field work was done by Ronald K. Paulick, Billings, who volunteered his time to the nongame program. A final report (Flath and Paulick, in prep.) will be published elsewhere.

Habitat Associations of Small Mammal Communities

Distribution and habitat associations of many species of small mammals are poorly known in Montana. To provide base-line data on indigenous species, 48 habitat-specific study plots were selected for sampling. Ten plots were sampled in 1977; an additional 38 plots are scheduled for sampling during 1978-79. Analysis and interpretation of data presented here is inappropriate pending complete sampling of all study plots.

General location of study plots is based on descriptions provided by Ross and Hunter (1976). Specific sample sites are located with the aid of local biologists. All sites sampled are representative of the habitat types described by Ross and Hunter (1976) and their system of numbering is used.

Two traplines were sampled concurrently on each of the selected plots, with the exception of type 4, which had only one trapline. Each trapline contained 25 stations on a line, 30 feet apart. Each station contained one sunken can pitfall, one Sherman live-trap and two snap-traps. Trapping was conducted for five consecutive nights on each

trapline, resulting in 500 trap-nights of effort per line except when conditions resulted in missing traps. Results of trapping effort on ten plots is presented in Table 1.

Avian Studies

Burrowing Owl Investigations

Status of the Burrowing Owl (*Speotyto cunicularia)* in Montana

Preliminary observations of burrowing owls in Montana indicate investigation is necessary to reveal the status of the species. Zarn (1974) indicated that burrowing owls are generally declining throughout most of their range. This phenomenon is more apparent in the northern part of its range (central Colorado to Canada) than in the southern portion.

Historical reports typically refer to burrowing owls as a normal component of all prairie dog towns. Scheffer (1937:392), in Kansas, stated "In the usual association with prairie dog villages, about twenty burrowing owls (*Speotyto cunicularia)* claimed this townsite as their abiding place." He apparently counted both adult and young birds. Koford (1958:34), also referring to burrowing owl-prairie dog associations, stated "In Wichita Mountains Refuge and many other localities, burrowing owls once were common, but they have disappeared."

In 1976, 23 prairie dog towns were inspected in south Phillips County, Montana for the presence of burrowing owls. Twenty-one of these contained no owls or any evidence of owl occurrence. A single owl was present on one town temporarily, while another town (1000 A.) contained 5 adults (2 of which were nonbreeders) and 10 young (broods of 4 and 6).

Efforts to locate burrowing owls were expanded in 1977. Eleven occupied sites were visited in Sheridan, Phillips, Fergus and Wheatland Counties. Seven sites contained only a single nonbreeding adult, one contained a pair but no young, and three contained pairs with young.

Previous 2-year studies suggest expansion of burrowing owl investigations. Objectives of these efforts should be to determine population status, fledging success, breeding:nonbreeding ratios, and site fidelity.

The following procedures are recommended:

1. Inventory at least 100 occupied sites through cooperation with Audubon Society members, department employees and U. S. Bureau of Land Management (BLM) personnel.

2. Visit each site during July of two successive years and determine a) number of adults, b) number of broods, c) number of young, and d) type of burrow.

TABLE 1. Results of small mammal sampling efforts on 10 selected study plots sampled in 1977.

SCS TYPE		1	2	3	4	6
Location:	Co.:	Sheridan	Valley	Valley	Valley	Sheridan
	T.:	37N	34N	35N	28N	31N
	R.:	57E	36E	35E	37E	57E
	Sec.:	SE¼,7	NW¼,26	N.Cent.30	SE¼,13	S.Cent.19
Trap-nights :	Live:	250	250	249	125	249
	Pitfall:	250	250	244	125	250
	Snap:	500	500	500	250	499
	Total:	1000	1000	993	500	998
Species noted:						
Psuedacris triseriata		-	-	2	-	-
Crotalus viridis		-	-	1	-	-
Sorex cinereus		12	-	-	-	1
S. preblei		-	-	1	-	-
Microsorex hoyi		1	-	-	-	-
Spermophilus tridecemlineatus		-	-	1	-	2
Peromyscus maniculatus		26	17	11	10	24
Microtus pennsylvanicus		1	-	-	-	-
Lagurus curtatus		-	-	1	-	1

TABLE 1. (Continued)

SCS TYPE		22	33	37	50	61
Location:	Co.:	Valley	Carbon	Carbon	Carbon	Gallatin
	T.:	23N	9S	9S	9S	2N
	R.:	34E	23E	26E	26E	3E
	Sec.:	Cent.12	NW¼,5	Cent.10	NW¼,1	NE¼,4 and SE¼,27
Trap-nights:	Live :	250	250	239	250	250
	Pitfall:	250	250	250	225	250
	Snap :	500	500	500	500	750
	Total :	1000	1000	989	975	1250
Species noted:						
Sceloporous graciosus		-	-	-	1	-
Oberholseria chlorura		-	-	-	2	-
Sorex cinereus		-	-	-	-	31
S. vagrans		-	-	-	-	1
S. merriami		1	-	2	-	-
Eutamias minimus		-	1	-	-	-
E. amoenus		-	-	-	-	1
Dipodomys ordii		-	-	1	-	-
Peromyscus maniculatus		15	21	4	26	19
Neotoma cinerea		2	-	-	-	-
Microtus pennsylvanicus		-	-	-	-	16
M. montanus		-	-	-	-	2
Sylvilagus audubonii		-	-	1	1	-

Food Habits of the Burrowing Owl (*Speotyto cunicularia*) in Montana

The status of the burrowing owl in Montana is presently unknown, but is believed to be declining. Zarn (1974) indicates that this decline is a general phenomena over much of the species' range. Reasons for the decline are generally believed to be (a) poisoning of rodents, and (b) development of owl habitat. Both factors serve to reduce the availability of burrows to owls, thus limiting owl numbers. Preliminary observations in Montana suggest that this is not the case here. In areas where prairie dogs (*Cynomys ludovicianus*) are abundant, burrowing owls are either absent or poorly represented.

Investigations of food habits and foraging ecology will be undertaken to help identify factors limiting this species in Montana. About 200-250 burrowing owl pellets have been collected to date, but these have not yet been analyzed. Additional work will be done by Pat Nichols, an M.S. degree candidate at the University of Montana and department nongame personnel.

Raptor Investigations

Statewide Raptor Survey Route System

The objective of the Raptor Survey Route System is to establish trend data on abundance and distribution of 17 species of diurnal raptors in Montana. Usefulness of these data will be very limited in the early years,but will increase in value in future years.

This system is a series of vehicle routes which are run twice yearly. One route is located in each of the state's latilongs (degree blocks), and is approximately 50 miles long. Route were initially located in consultation with local game wardens, biologists and BLM personnel. Methods used and a form for recording observations are presented as Appendix I and II respectively.

During June 1977, 43 routes were completed. Observers drove a total of 2,260 miles and recorded 438 diurnal raptors. Species compilation is presented in Table 2, and latilong distribution of most species is presented in Figures 1 through 11.

Prior to the January, 1978 sample-period, cooperators were polled via questionnaire (Appendix III) as to the adequacy of the methods employed. Survey methods were altered accordingly and new instructions were printed for use during subsequent survey periods (Appendix IV).

During January, 1978, severe weather prevailed across most of Montana and only 33 routes were completed. Observers drove a total of 1,687 miles and recorded 172 diurnal raptors. Species compilation is presented in Table 3, with latilong distribution for most species presented in Figures 12 through 19.

Table 2: Number of diurnal raptors observed during the June, 1977 raptor survey period.

Turkey vulture	6
Goshawk	1
Red-tailed Hawk	67
Swainson's Hawk	43
Rough-legged Hawk	2
Ferruginous Hawk	13
Golden Eagle	30
Marsh Hawk	50
Osprey	5
Prairie Falcon	10
Peregrine Falcon	1
Merlin	1
Kestrel	179
Unidentified	30

Table 3: Number of diurnal raptors observed during the January, 1978 raptor survey period.

Sharp-shinned Hawk	1
Red-tailed Hawk	4
Rough-legged Hawk	89
Golden Eagle	41
Bald Eagle	15
Marsh Hawk	1
Prairie Falcon	8
Merlin	2
Kestrel	3
Unidentified	8

Figure 1: Distribution of Turkey vulture sightings, June, 1977 raptor survey.

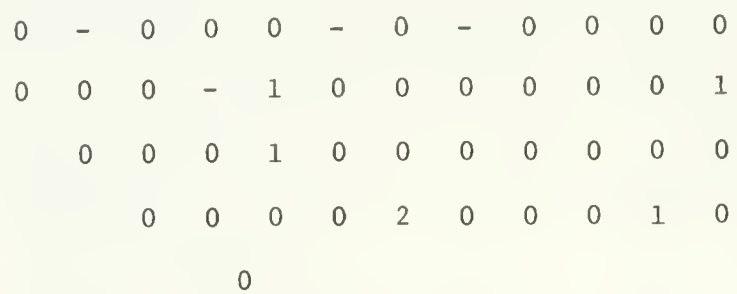


Figure 2: Distribution of Goshawk sightings, June, 1978 raptor survey.

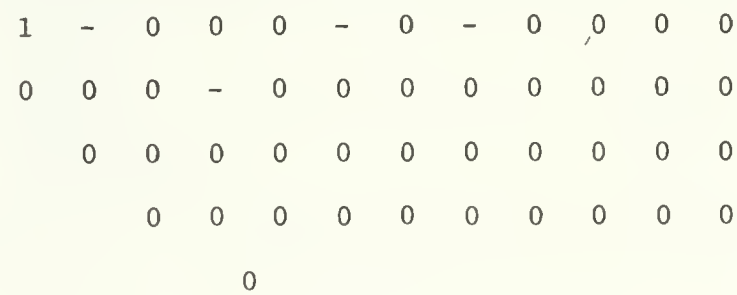


Figure 3: Distribution of Red-tailed hawk sightings, June 1977 raptor survey.

0	-	0	2	1	-	0	-	0	0	0	2
0	1	1	-	1	1	0	0	0	1	4	2
	1	7	0	1	1	1	7	0	0	2	0
		1	5	0	2	2	0	0	4	7	4
				6							

Figure 4: Distribution of Swainson's hawk sightings, June, 1977 raptor survey.

0	-	0	0	10	-	0	-	0	4	5	0
0	0	0	-	0	1	3	1	0	0	0	2
	0	0	0	0	5	0	0	0	0	0	0
		1	0	0	0	0	0	0	0	0	1
				10							

Figure 5: Distribution of Rough-legged hawk sightings, June, 1977 raptor survey.

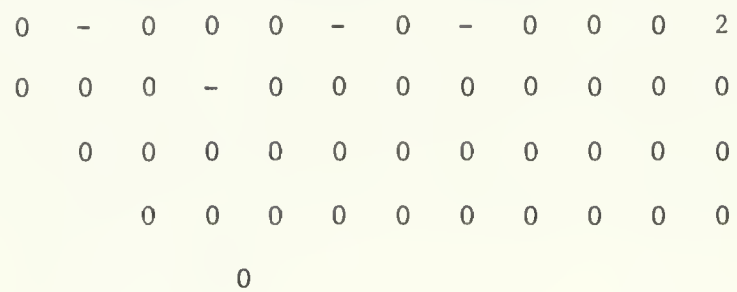


Figure 6: Distribution of Ferruginous hawk sightings, June, 1977 raptor survey.

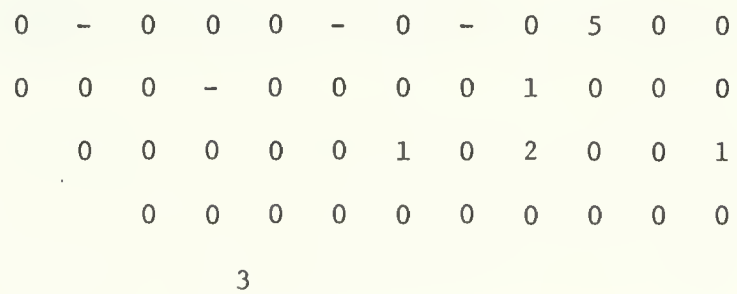


Figure 7: Distribution of Golden eagle sightings, June, 1977 raptor survey.

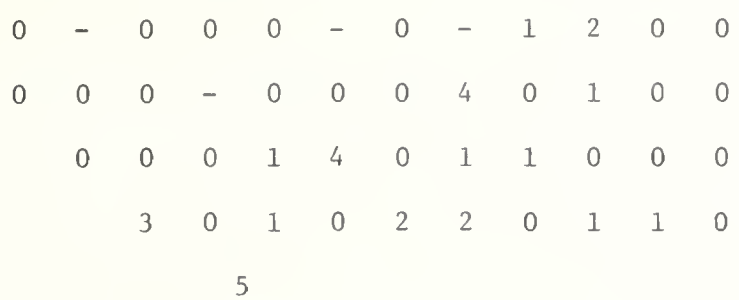


Figure 8: Distribution of Marsh hawk sightings, June, 1977 raptor survey.

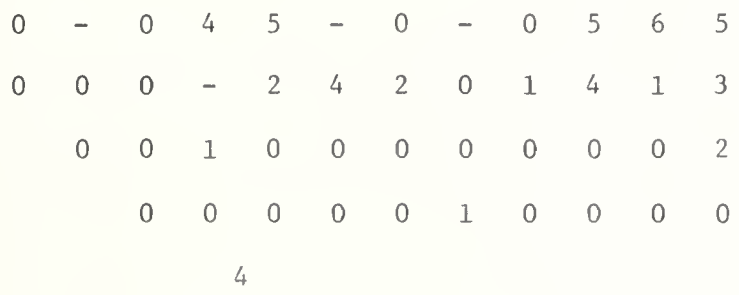


Figure 9: Distribution of Osprey sightings, June, 1977 raptor survey.

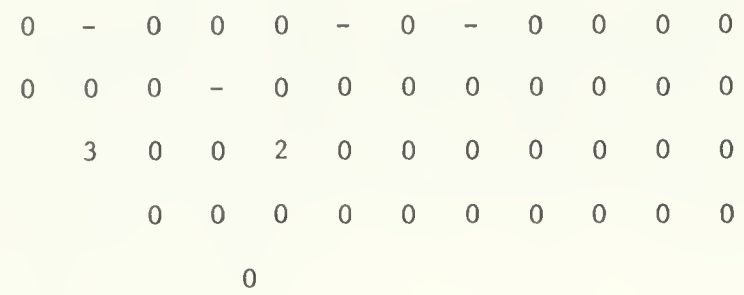


Figure 10: Distribution of Prairie falcon sightings, June, 1977 raptor survey.

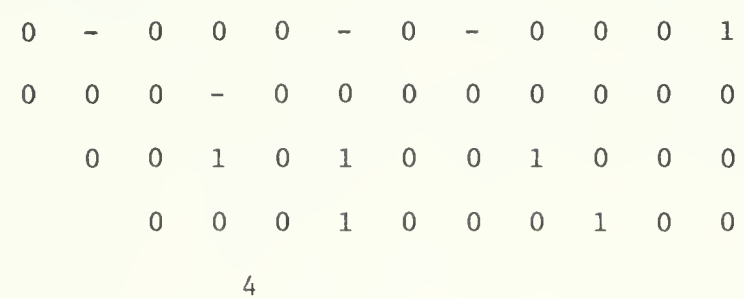


Figure 11: Distribution of Kestrel sightings, June, 1977 raptor survey.

1	-	0	2	0	-	0	-	0	8	0	2
2	2	1	-	0	2	15	5	3	3	0	6
	11	4	5	0	1	3	7	3	4	5	0
		8	10	2	3	2	8	0	17	10	0
			24								

Figure 12: Distribution of Sharp-shinned hawk sightings, January, 1978, raptor survey.

0	0	0	-	0	0	0	-	0	0	0	0
0	-	0	0	0	0	-	-	-	0	0	-
	0	0	0	0	0	0	0	-	0	0	-
		-	0	0	0	-	1	-	0	0	0
			-								

Figure 13: Distribution of Red-tailed hawk sightings, January, 1978 raptor survey.

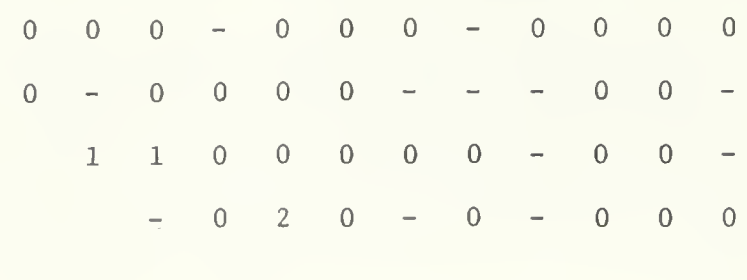


Figure 14: Distribution of Rough-legged hawk sightings, January, 1978 raptor survey.

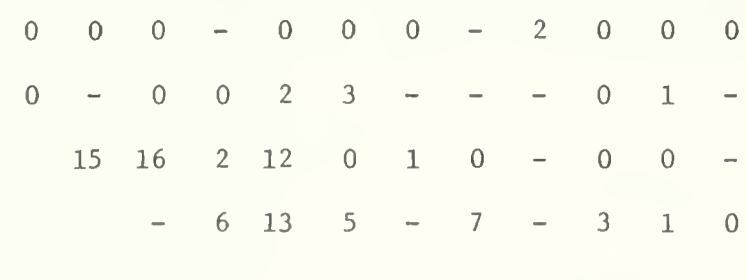


Figure 15: Distribution of Golden eagle sightings, January, 1978 raptor survey.

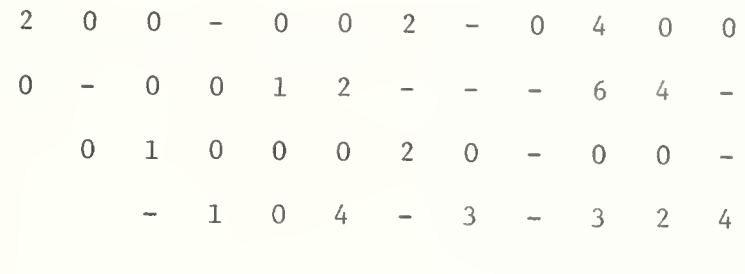


Figure 16: Distribution of Bald eagle sightings, January, 1978 raptor survey.

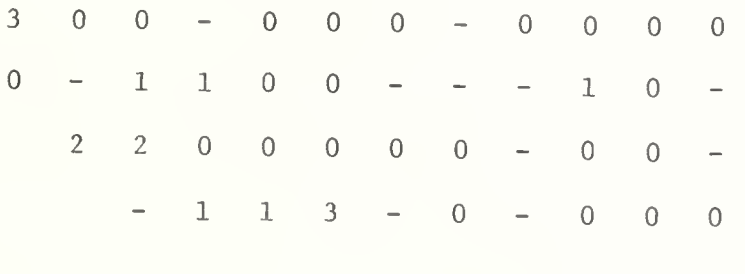


Figure 17: Distribution of Marsh hawk sightings, January, 1978 raptor survey.

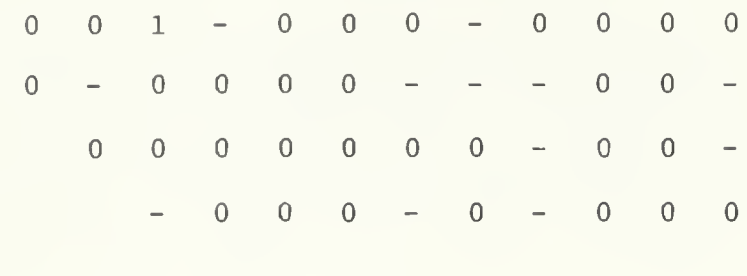


Figure 18: Distribution of Prairie falcon sightings, January, 1978 raptor survey.

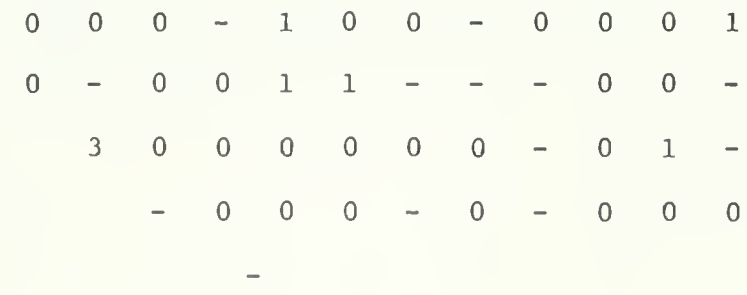
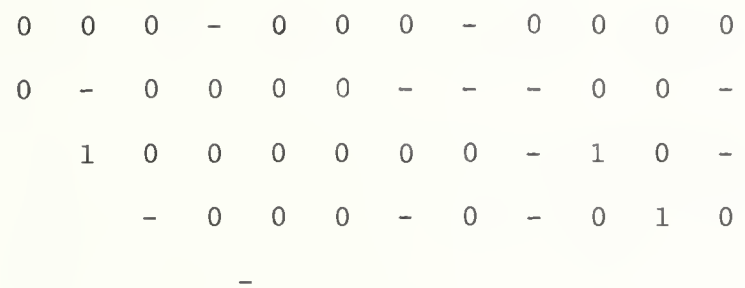


Figure 19: Distribution of Kestrel sightings, January, 1978 raptor survey.



Experimental Eagle Classification

Occasional requests for data on the status of eagles (*Haliaetus leucocephalus* and *Aquila chrysaetos)* in Montana have clearly demonstrated the need for information on population recruitment, which in turn reflects species welfare. The usual technique is to climb into eagle eyries and count eggs or chicks. This technique is considered inappropriate for general use for the following reasons: 1) it is time-consuming since eyries must be located and substantial time and equipment are necessary for subsequent inspection; the volume of data collected per unit of effort expended is low; 2) nesting and/or hatching success are not reliable indicators of fledging success; and 3) nest site disturbance may result in some unknown mortality, thereby artificially reducing fledging success. A technique utilizing age-classified field observations at biologically important phases of annual cycles of eagles seems more appropriate for more extensive field use.

Objectives of this study are to:
1) determine the feasibility of assessing population recruitment of golden eagles based on changing immature/mature ratios during the course of a year;
2) determine immature/mature ratios for wintering bald eagles; and
3) attempt to detect different migration patterns for mature and immature bald eagles.

The principle investigator and four cooperators (Ron Paulick, Chris Servheen, Jon Swenson and John Ciralli) will record eagle observations throughout 1978 (Appendix V).

Ferruginous Hawk (*Buteo regalis)* Investigations

The ferruginous hawk is a large buteo of the western plains. It is no longer as abundant as it was in the early part of this century. Loss of suitable grassland habitat to agricultural practices is probably a primary reason for the apparent population reduction.

The status of the ferruginous hawk in Montana is completely unknown. Fourteen nests were located in Beaverhead County in 1977, two of which contained chicks (2 and 3) while the others were vacant. Efforts to assess the status of this species will be continued as time and available manpower permit.

The problem of nest desertion is acute where this species is subjected to human disturbance (Davy 1930, Howard and Powers 1973, Olendorff 1973, Smith and Murphy 1973). During egg-laying and incubation periods, these birds will generally abandon their nest if any human activity occurs within close proximity of the nest site. Once the young have hatched, the probability of desertion is very slight. With respect to this problem, Snow (1974:14) stated: "With the increasing demand on public lands for resource development and recreation, human activity in areas with nesting populations of ferruginous hawks may become a severe limiting factor if such activity occurs during the period before the young hawks have hatched.

This will mean a loss of habitat for ferruginous hawks even if the land itself is left intact and not altered during development."

Since eleven of the 14 nests (including both active nests) located in 1977 occurred on Department-owned property, the following management recommendations were made:

1. Prohibit human activity within four hundred (400) yards of all nesting sites from March 1 to June 1. This closure should be only an on-ground management measure. Use of signs should be avoided since signs may call attention to the birds and thus cause additional problems.

2. Prohibit human activity within one hundred-fifty (150) yards of those nesting sites which contain young from June 1 to July 20. Again, signing should be avoided.

3. Maintain an adequate prey base by prohibiting any poisoning or other large scale control of ground squirrels, marmots, jack rabbits or chipmunks. Occasional sport shooting of these species should have no appreciable effect on net availability of prey.

ENDANGERED SPECIES ACTIVITIES

Section 26-1802(4), R.C.M. 1947 defines endangered species as "any species or subspecies of wildlife actively threatened with extinction due to any of the following factors:

(a) the destruction, drastic modification, or severe curtailment of its habitat, or
(b) its overutilization for scientific, commercial or sporting purposes, or
(c) the effect on it of disease, pollution, or predation, or
(d) other natural or man-made factors affecting its propsects of survival or recruitment within the state, or
(e) any combination of the foregoing factors."

An official list of Montana's endangered species pursuant to Sec. 26-1805, R.C.M. 1947 was established by the 1975 Montana Legislature in the form of House Joint Resolution No. 41. This list includes the American peregrine falcon (*Falco peregrinus anatum*), the whooping crane (*Grus americana*), the Northern Rocky Mountain wolf (*Canis lupus irremotus*) and the black-footed ferret (*Mustela nigripes*).

Due to lack of funding most activities on endangered species can be categorized as administrative, informative and educational. Reports of endangered species occurrence have been routinely compiled, but few follow-up investigations have been made.

Peregrine falcon

Several reports of peregrine occurrence have been compiled, including several from one discrete geographic area over the past 2 years. Since this area contains a known historic eyrie, further investigations are warranted.

Peregrine falcons have been the subject of information and education efforts on numerous occasions. Public information on peregrines has frequently been disseminated via mass media. The life history and basic ecology of this species was published by Flath (1976b).

Availability of additional funds for peregrine falcon conservation should permit:

1. Compiling records of known historic eyries in Montana;
2. Visiting each identified site at least twice during incubation and/or nestling stages to ascertain presence or absence of peregrines;
3. Attempting to locate new eyrie sites in areas of suspected peregrine occurrence;
4. Intensifying efforts to locate sites used by migrant or wintering peregrines; and
5. Developing recommendations for further investigations on any occupied eyries which may be discovered and on any sites which are used by migrant or wintering peregrines.

The first year's efforts should constitute survey and inventory effort to reveal presence or absence of peregrines and the circumstances under which they occur. Detailed site-specific studies should not be conducted at this time. Intensified research and management efforts should be developed after survey and inventory efforts are completed.

Whooping crane

During the past 20 migration periods (1968-1977 inclusive), eight documented occurrences of whooping cranes have been recorded for Montana. Six occurred during spring migrations, while 2 were during fall migrations. Average group size was 4.9 (range 2-9) with an average length of stay 2.1 (range 1-8) days. Four occurrences were on National Wildlife Refuges in eastern Montana and 2 were near those refuges. A total of 64 whooping crane-days of use have been recorded during this 10-year period.

Public information on whooping cranes has frequently been disseminated via mass media. Life history and basic ecology of the whooping crane have been presented by Flath (1975c).

Since whooping cranes occur in Montana only as casual migrants, a research and management plan is inappropriate. It is recommended that Department personnel cooperate to the extent necessary in protecting migrants and reporting sightings.

Northern Rocky Mountain wolf

The most salient activity pertinent to wolf conservation has been participation on the Northern Rocky Mountain wolf Recovery Team. Side effects of Recovery Team activity have included compilation of a substantial number of reports of wolf sightings, howling, and mortalities, or evidence of wolf activity (tracks, scats, kill sites). A summation of these reports is presented in the Introduction of the Draft Recovery Plan (Anon. 1978).

The Recovery Team developed and distributed forms for recording wolf sightings (Appendix VI) and evidence of wolf activity (Appendix VII). Completed forms are filed by area and year. Efforts are made to follow up all reports with interviews and/or field reconnaissance to evaluate report validity. Nearly all Montana wolf reports have come from two widely separated areas. Montana Department of Fish and Game involvement in such follow-up has been very limited due to lack of manpower and money.

Life history and basic ecology of the wolf has been discussed by Flath (1975b). Public information has been disseminated via mass media on numerous occasions.

Assuming the availability of additional funds for wolf conservation, the following should be implemented:

1. Intensify survey and inventory efforts in those areas which have consistently produced good reports of wolf activity within the past 2 years;
2. Conduct intensive field surveys in response to new reports of wolf activity; and
3. Attempt to identify seasonal use patterns.

These efforts constitute a basic survey and inventory effort for wolves. Management considerations should be deferred pending compilation of suitable survey and inventory data.

Black-footed ferret

Reports of ferret occurrence in Montana have been compiled, but few follow-up surveys have been made. Four localities are presently suspected of harboring black-footed ferrets. One site has produced a confirmed sighting and efforts are currently underway to reach an agreement with landowners to insure perpetuation of ferrets in that area. Strong circumstantial evidence of ferret activity has been recorded at a second site for 3 consecutive years (1975, 1976, 1977). A third site has produced a good, but unverified, sighting; follow-up investigations revealed strong circumstantial evidence of ferret activity in 1976 and 1977. A fourth site has produced two good, but unverified sightings of ferrets. The two reports were made independent of one another, but follow-up investigations have not been made.

Many prairie dog towns have been surveyed for evidence of ferret activity. Occasional unverified reports of ferrets have been received, several of which were subsequently identified as weasels, ranch mink, and marten.

The life history and basic ecology of the black-footed ferret has been presented by Flath (1976a). Public information has been frequently disseminated via mass media.

Availability of additional funds for black-footed ferret conservation should permit:

1. Initiating an inventory of prairie dog towns, map location and estimated size of each town;
2. Surveying prairie dog towns for evidence of ferret activity;
3. Conducting night survey of prairie dog towns which display evidence of ferret activity;
4. Developing management recommendations for ferret occupied sites; and
5. Initiating studies on ecological relationships between prairie dogs and other forms of wildlife.

Items 1-4 constitute a basic survey and inventory effort for black-footed ferrets. Item 5 is designed to reveal additional considerations in prairie dog management which in turn will influence future availability of potential ferret habitat.

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APPENDIX I

INSTRUCTIONS FOR RAPTOR SURVEY ROUTES

DATES OF SURVEY

Winter routes should be completed between January 1 and January 15, inclusive. Summer routes should be completed between June 1 and June 15, inclusive. When unavoidable, surveys may be extended to the 22nd.

WEATHER CONDITIONS

Do not conduct survey when (1) wind velocity exceeds Beaufort 3; (2) sky condition exceeds 2.

STARTING TIME

Start routes as near 11:00 AM as possible. Try to complete route within 4 hours.

SURVEY PROCEDURES

Drive route at 20-25 mph, stopping only to identify and record raptors. Binoculars should be used to locate and identify raptors. Spotting scopes may be used for identification, but not for scanning an area. Carry a field guide for aid in identification. When possible, classify raptors as adult or immature. Make a special effort to avoid recording the same bird more than once. Record time, mileage, wind velocity and sky condition at start and finish. Use the 2400 hour system for recording time.

OBSERVERS

If possible, two people should conduct the survey along each route. Include names of both observers on the report form. Where only one observer is involved, extra time may be required.

WIND VELOCITY

Beaufort Number	Velocity (mph)	Suggestions for Estimating Wind Velocity
0	less than 1	Smoke rises vertically.
1	1 to 3	Direction of wind shown by smoke drift, but not by wind vanes.
2	4 to 7	Wind felt on face, leaves rustle, ordinary wind vane moves.
3	8 to 12	Leaves and small twigs in constant motion; wind extends light flag.

SKY CONDITIONS

0 - Clear or a few clouds
1 - Partly cloudy or variable
2 - Cloudy (broken) or overcast
4 - Fog or smoke
5 - Drizzle
8 - Showers

1/77

APPENDIX II

MONTANA DEPARTMENT OF FISH AND GAME
NONGAME WILDLIFE INVESTIGATIONS

RAPTOR SURVEY

ROUTE _____ NUMBER _____

TIME Start [ ][ ][ ][ ] Finish [ ][ ][ ][ ]

DATE Month [ ][ ] Day [ ][ ] Year [ ][ ]

MILEAGE [ ][ ][.] [ ][ ][.] Total [ ][ ][.]

WIND SPEED Start [ ] Finish [ ]

SKY [ ] [ ]

OBSERVERS _____

MAILING ADDRESS _____ ZIP CODE _____

Species	Number of Birds			Total
	Adult	Immature	Unclassified	
Turkey vulture				
Goshawk				
Sharp-shinned hawk				
Cooper's hawk				
Red-tailed hawk				
Swainson's hawk				
Rough-legged hawk				
Ferruginous hawk				
Golden eagle				
Bald eagle				
Marsh hawk				
Osprey				
Gyrfalcon				
Prairie falcon				
Peregrine falcon				
Pigeon hawk				
Sparrow hawk				
Other:				
Unidentified				
TOTALS				

Notes:

Return form to:
Dennis L. Flath, Biologist
Montana Dept. of Fish & Game
Box 5 - MSU Campus
Bozeman, MT 59715

APPENDIX III

RAPTOR SURVEY ROUTE QUESTIONNAIRE

NAME: _____

ROUTE NUMBERS: _____

1. Do you feel that the June 1-15 period was appropriate for your route(s)?

   YES _____ NO _____

   If not, what changes do you recommend?

   _____

   _____

2. Do you feel that the 11:00AM starting time was appropriate for your route(s)?

   YES _____ NO _____

   If not, what changes do you recommend?

   _____

   _____

3. Do you feel the location of your route(s) was appropriate?

   YES _____ NO _____

   If not, what changes do you recommend?

   _____

   _____

   _____

   _____

4. Do you feel that the prescribed methods of travel and observation were appropriate for your route(s)?

   YES _____ NO _____

   If not, what changes do you recommend?

   _____

   _____

PLEASE RETURN THIS FORM AT YOUR EARLIEST CONVENIENCE. ONLY THROUGH YOUR COOPERATION AND ADVICE CAN THE RAPTOR SURVEY ROUTE SYSTEM BE IMPROVED.

APPENDIX IV

INSTRUCTIONS FOR RAPTOR SURVEY ROUTES

DATES OF SURVEY

WINTER ROUTES should be completed between January 1 and January 20, inclusive. SUMMER ROUTES should be completed between May 15 and June 5, inclusive. When unavoidable, surveys may be extended one week.

WEATHER CONDITIONS

Do not conduct survey when (1) wind velocity exceeds Beaufort 3; (2) sky condition exceeds 2.

STARTING TIME

WINTER ROUTES start as near 9:00 AM as possible. SUMMER ROUTES start as near 7:30 AM as possible. Try to complete route within 4 hours.

SURVEY PROCEDURES

Drive route at 20-25 mph, stopping only to identify and record raptors. Binoculars should be used to locate and identify raptors. Spotting scopes may be used for identification, but not for scanning an area. Carry a field guide for aid in identification. When possible, classify raptors as adult or immatures. Make a special effort to avoid recording the same bird more than once. Record time, mileage, wind velocity and sky condition at start and finish. Use the 2400 hour system for recording time.

OBSERVERS

If possible, two people should conduct the survey along each route. Include names of both observers on the report form. Where only one observer is involved, extra time may be required.

WIND VELOCITY

Beaufort Number	Velocity (mph)	Suggestions for Estimating Wind Velocity
0	less than 1	Smoke rises vertically.
1	1 to 3	Direction of wind shown by smoke drift, but not by wind vanes.
2	4 to 7	Wind felt on face, leaves rustle, ordinary wind vane moves.
3	8 to 12	Leaves and small twigs in constant motion; wind extends light flag.

SKY CONDITIONS

0 - Clear
1 - Partly cloudy or variable
2 - Cloudy (broken) or overcast
4 - Fog or smoke
5 - Drizzle
8 - Showers

MONTANA DEPARTMENT OF FISH AND GAME

Nongame Wildlife Investigations

Eagle Classification

Date	Location	BALD			GOLDEN			Unidentified
		Adult	Imm.	Unclass.	Adult	Imm.	Unclass.	

APPENDIX VI

BY: _____(name)
_____(address)
_____(occupation)

RETURN TO: Dennis L. Flath, Leader
Northern Rocky Mountain
Wolf Recovery Team
Box 5 - MSU Campus
Bozeman, MT 59715
OR CALL: (406) 994-4241

WOLF SIGHTING

Date: _____ OBSERVER: _____
(name)
Time: _____ _____
(address)
Weather Conditions: _____ _____
_____ (occupation)

Reason for observer being in area: _____

Number of observers: _____

Location: _____

_____

Specific habitat type: _____

Number of animals: _____

Size differences in animals: _____

_____

Distance between observer and animals: _____

Behavior of animals: _____

_____

Length of observation: _____

Type of observation: _____
(binoculars, riflescope, etc.)

Circumstances of observation: _____
(riding in car, hiking, etc.)

Physical characteristics of animals:

1) Color: _____
2) Size: _____
(estimate weight or compare to dog of similar size)
3) Position of tail: _____
4) Track size: _____
5) Any other characteristics which indicate wolf rather than dog or coyote: _____

_____

Was photograph taken? _____ Where is it? _____

Have you seen wolves before? _____ Where? _____
(wild, zoo, museum, etc.)

Relative nos. of prey (deer, elk, moose, etc.) in area: _____

_____

Number of humans in area: _____
(a lot, a little, etc.)

Straight-line distance to nearest people-occupied area: _____

_____
(ranch, town, road, campground, etc.)

Use reverse for any additional information.

APPENDIX VII

BY: _____(name)

_____(address)

_____(occupation)

RETURN TO: Dennis L. Flath, Leader
Northern Rocky Mountain
Wolf Recovery Team
Box 5 - MSU Campus
Bozeman, MT 59715
OR CALL: (406) 994-4241

WOLF SIGN DATA

Date: _____
Time: _____
Weather Conditions: _____

_____

OBSERVER: _____
(name)

_____
(address)

_____
(occupation)

DEN TRACKS HOWLING SCAT KILL SCENTPOST
(circle appropriate ones)

Location: _____

_____

_____

Habitat type: _____

Minimum nos. of animals indicated by sign: _____ Maximum nos.: _____

Size of tracks: _____ Diameter of scat: _____

Length of pace: _____ Length of howling: _____

Was there evidence of large dogs in area: _____ Closest inhabitant with large dog: _____
(name and address)

Activity of animals indicated by sign: _____

_____

Detailed account of observed sign: _____

_____

_____

_____

_____

_____

_____

_____
(continue on back)

Relative nos. of prey items (deer, elk, moose, etc.) in area: _____

_____

Was photograph taken or picture drawn or cast taken, etc.? _____

If so, who has it now? _____
(name and address)

Total number of observers: _____

Amount of human use in area: _____
(heavy - light)

Straight-line distance to nearest people-occupied area: _____

_____
(ranch, town, road, campground, etc.)

Use reverse for any additional information.